

motion between the current and reconstructed previous frames. The reconstructed previous frame is reconstructed from a previously encoded frame as described more completely below. For each of one or more macroblocks of the current frame, motion estimator/compensator 108 derives a motion vector which specifies a portion of the reconstructed previous frame which the macroblock corresponds and an associated motion vector error signal. A motion vector specifies a motion-compensated macroblock in terms of a vector to an equal-sized portion of another frame. A macroblock specified by a motion vector of a particular macroblock is sometimes referred to herein as a macroblock which is temporally displaced from the particular macroblock. A motion vector error signal represents an amount of variation between the macroblock and a temporally displaced macroblock of the macroblock.

Motion estimator/compensator 108 produces a current motion-compensated frame from the motion vectors and the current and reconstructed previous frames received from buffers 102 and 128. Motion estimator/compensator 108 passes the motion-compensated frame to transform coder 110 which performs a transformation, e.g., a direct cosine transformation (DCT), on the motion-compensated macroblocks of the motion-compensated frame to produce a transformed frame. Transform coder 110 passes the transformed frame to a quantizer 112. Quantizer 112 quantizes coefficients used in transform coder 110 and these coefficients are then used later for Huffman coding the transformed frame to complete compression of the current frame retrieved from buffer 102. Huffman coding is described more completely in copending U.S. Patent Application 08/418,805, ^{now abandoned,} for "Method and Apparatus for Implementing Motion Detection and Estimation in Video Compression" (Attorney Docket No.: VXTMP003/VXT701) filed on March 14, 1997, and that description is incorporated herein by reference.

As described briefly above, a reconstructed previous frame is used to estimate motion between consecutive frames. The reconstructed previous frame is formed as follows. A dequantizer 120 receives the encoded current frame from quantizer 112 and performs the inverse of the quantization performed by quantizer 112. The dequantized frame is transferred from dequantizer 120 to a transform decoder 122 which performs an inverse transformation of the transformation performed by transform coder 110. A frame reconstructor 124 receives the